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LEE & HAYES PLLC
421 W RIVERSIDE AVENUE SUITE 500
SPOKANE, WA 99201

EXAMINER	
SANDERS, AARON J	

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2169	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/826,159	ZENG ET AL.	
	Examiner	Art Unit	
	Aaron J. Sanders	2169	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 April 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-40* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-40* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *15 April 2004* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *See Continuation Sheet*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Continuation of Attachment(s) 3). Information Disclosure Statement(s) (PTO/SB/08), Paper No(s)/Mail Date :08/02/2004, 09/09/2004, 09/21/2005, 01/03/2006, 06/19/2006, 09/18/2006.

DETAILED ACTION

This action is responsive to the application filed on 15 April 2004.

Claims 1-40 have been examined and are pending in this application.

Drawings

The drawings are objected to because in Fig. 1, solid line 104 is called an "Interlayer Link", but in the specification, see e.g. [0028], it is referred to as an "intralayer link". For purposes of examination, the solid lines will be interpreted as "intralayer links". Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

As per claims 1, 13, 22, and 34, the limitation "ones of two or more multi-type data objects" is vague and indefinite as written. It appears to mean that the "respective ones" are "multi-type data objects", but this is not clear.

As per claims 5, 8, 13, 18, 26, 29, 35, and 38, the limitation "respective ones of the relationships" lacks antecedent basis in the claims. The limitation may refer to the "ones of two or more multi-type data objects" in claim 1, but the connection is not clear.

As per claims 8, 10, 11, 18, 29, 31, 32, and 38, the limitation "individual ones" lacks antecedent basis in the claims. The limitation may refer to the "ones of two or more multi-type data objects" in claim 1, but the connection is not clear.

As per claim 8, 18, 29, and 38, the phrase "determining similarity between" is grammatically incorrect. It appears to need an article before "similarity".

As per claims 9, 17, 19, 30, and 39, the limitation "related ones" lacks antecedent basis in the claims. The limitation may refer to the "ones of two or more multi-type data objects" in claims 1 or 13, but the connection is not clear.

As per claims 10, 11, 31, and 32, the phrase "mutually reinforcing importance of" is grammatically incorrect. It appears to need an article before "importance".

As per claims 11 and 32, the phrase "is based on the following" is vague and indefinite. It is not apparent which of the limitations "reinforcing importance of individual ones" must contain. It is therefore unclear whether the limitations following the phrase are part of the claimed invention.

As per claims 12, 21, 33, and 40, the phrase "with feature space of" is grammatically incorrect. It appears to need an article before "feature".

As per claims 17 and 37, the limitation "indicated data object relationships" lacks antecedent basis in the claims.

Claim Rejections - 35 USC § 112 First Paragraph

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 11 and 32 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claims contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The meaning of T is not disclosed in either the specification or the claims. Paragraph [0094] discloses the meaning of t_i as, "a word shared by X and D_j", but this clearly does not apply to the instant claims since it is cited in regards to the "cosine similarity" function and is a lowercase t versus an uppercase T. Paragraph [0103] discloses the meaning of a T as "a target term", but this clearly does not apply to the instant claims since it is cited in regards to the relationship between terms, particularly as discussed in regards to Table 1, and not to data objects and object types. Further, the same paragraph defines R as "a related term" while the instant claims define R as representing the "relationships between respective objects of the multi-type data objects".

Claim Rejections - 35 USC § 112 Second Paragraph

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 2-12, 14-21, 23-33, and 35-40 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

As per claims 11 and 32, a mathematical formula is recited and then the meaning of its variables is described. Within that description is the limitation "R_X, R_Y, R_{XY} and R_{YX} represent relationships between respective objects of the multi-type data objects". However, there are no R's in the formula.

As per claims 2-12, 14-21, 23-33, and 35-40, the preambles "A method as recited", "A computing device as recited", "A computer-readable medium as recited", and "A computing device as recited" respectively, render the claims indefinite. Each dependent claim should refer back to the claim(s) it further limits. Examples of appropriate preambles for a dependent claim are, "The method as recited" or "The method of".

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 1-11, 13-20, 22-32, and 34-39 lack the necessary physical articles or objects to constitute a machine or a manufacture within the meaning of 35 USC 101. There also does not appear to be any tangible result of the data manipulation in the claims. Further, they are clearly not a combination of chemical compounds to be a composition of matter. Accordingly, the

claims do not appear to contain a useful result. As such, they fail to fall within a statutory category. They are, at best, functional descriptive material *per se*.

For example, in claims 1, 13, 22, and 34, "identifying" and "iteratively clustering" are data manipulations with no apparent output to a user or another system. In claims 11 and 32, the claims are simply a mathematical formula.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-5, 7-10, 13-15, 17-20, 22-26, 28-31, 34, 35, 37-39 are rejected under 35 U.S.C. 102(e) as being anticipated by Schuetze et al., U.S. P.G. Pub. 2003/0110181.

As per claims 1-5, 7-10, 13-15, 17-20, 22-26, 28-31, 34, 35, 37-39, Schuetze et al. teach:

1. A method comprising:

identifying relationships among respective ones of two or more multi-type data objects, wherein the respective ones comprise at least one object of a first type and at least one object of a second type different from the first type (See e.g. [0022], "Disparate types of information such as text, image features and usage are referred to as "modalities." Multi-modal clustering hence is the grouping of objects that have data from several modalities associated with them."); and

iteratively clustering the multi-type data objects in view of respective ones of the relationships to generate reinforced clusters (See e.g. [0043], "iterative clustering and selection of cluster subsets can help a user identify images of interest").

2. A method as recited in claim 1, wherein the relationships comprise inter-layer relationships including one or more of content related information, user interest in an associated topic, and user interest in an associated Web page (See e.g. [0032], "The method takes advantage of multiple ways in which a user can specify items of interest. For example, in images, features from the text and image modalities can be used to describe the images... clustering may be performed on a different feature (e.g., surrounding text, image URL, image color histogram, genre of the surrounding text)").

3. A method as recited in claim 1, wherein the relationships comprise intra-layer relationships including one or more of query refinement(s), recommended Web page(s), and relationship(s) between respective users (See e.g. [0028], "It is also useful to be able to track individuals' information access habits by way of the characteristics of the documents those users access, thereby enabling a recommendation system in which users are assigned to similar clusters").

4. A method as recited in claim 1, wherein each of the multi-type data objects are related to one or more of a search query data object type, a selected Web page type, and a user information type (See e.g. [0037], "Multi-modal features may take on many forms, such as user information, text genre, or analysis of images").

5. A method as recited in claim 1, wherein respective ones of the relationships are weighted to indicate importance to associated objects of the multi-type data objects (See e.g.

[0033], "various document features in different modalities are appropriately weighted and combined to form clusters representative of overall similarity").

7. A method as recited in claim 1, wherein iteratively clustering further comprises propagating clustering results of a first iteration to all related data objects of the multi-type data objects, at least two of the related data objects being of heterogeneous data type, the propagating being used to enhance clustering of respective ones of the multi-type data objects in a second iteration of reinforced clustering operations (See e.g. [0152], "Scatter/Gather iteratively refines a search by "scattering" a collection into a small number of clusters, and then a user "gathers" clusters of interest for scattering again. The Scatter/Gather method is extended by the invention to extend to a multi-modal, multi-feature method, using both text and image features to navigate a collection of documents with text and images").

8. A method as recited in claim 1, wherein iteratively clustering further comprises determining similarity between individual ones of the multi-type data objects, the similarity being a function of one or more of inter-object and intra-object content similarity and similarities between respective ones of the relationships (See e.g. [0003], "The invention relates to... an efficient scheme for assigning data objects in a collection to clusters based on similarities in their contents and characteristics").

9. A method as recited in claim 1, wherein iteratively clustering further comprises merging related ones of the multi-type data objects to reduce feature space dimensionality of the related ones (See e.g. [0033], "various document features in different modalities are appropriately weighted and combined to form clusters representative of overall similarity").

10. A method as recited in claim 1, wherein the method further comprises mutually reinforcing importance of individual ones of the multi-type data objects within an object type and between different object types (See e.g. [0097], "The use of token frequency weight and inverse context frequency weight for the embedding employed by the invention is consistent with the following intuitive description. Each additional occurrence of an element (or word, for example) in a context (e.g., a document) reflects an increased level of importance for that element as a descriptive feature").

13. A computing device comprising:

a processor (See e.g. Fig. 1, "processor 122"); and

a memory coupled to the processor, the memory comprising computer-program instructions executable by the processor for (Fig. 1 and [0077], "the collection 120 is hosted by one or more servers also coupled to the network 124" where a "server" includes a "memory"):

identifying relationships among respective ones of two or more multi-type data objects, wherein the respective ones comprise at least one object of a first type and at least one object of a second type different from the first type (See e.g. [0022], "Disparate types of information such as text, image features and usage are referred to as "modalities." Multi-modal clustering hence is the grouping of objects that have data from several modalities associated with them.");

iteratively clustering the multi-type data objects in view of respective ones of the relationships to generate reinforced clusters (See e.g. [0043], "iterative clustering and selection of cluster subsets can help a user identify images of interest"); and

wherein respective ones of the relationships are weighted to indicate importance to associated objects of the multi-type data objects (See e.g. [0033], "various document features in different modalities are appropriately weighted and combined to form clusters representative of overall similarity").

14. A computing device as recited in claim 13, wherein the relationships comprise inter-layer relationships including one or more of content related information, user interest in an associated topic, and user interest in an associated Web page (See e.g. [0032], "The method takes advantage of multiple ways in which a user can specify items of interest. For example, in images, features from the text and image modalities can be used to describe the images... clustering may be performed on a different feature (e.g., surrounding text, image URL, image color histogram, genre of the surrounding text)").

15. A computing device as recited in claim 13, wherein the relationships comprise intra-layer relationships including one or more of query refinement(s), recommended Web page(s), and relationship(s) between respective users (See e.g. [0028], "It is also useful to be able to track individuals' information access habits by way of the characteristics of the documents those users access, thereby enabling a recommendation system in which users are assigned to similar clusters").

17. A computing device as recited in claim 13, wherein the instructions for iteratively clustering further comprise instructions for aggregating indicated data object relationships to related ones of the multi-type data objects based on content of the reinforced clusters (See e.g. [0031], "Each modality within each document is described herein by an n-dimensional vector, thereby facilitating quantitative analysis of the relationships among the documents in the

collection" where, see [0076], "As illustrated in FIG. 1, each document (for example, an HTML document 110) chosen from a collection 120 maps to a set of feature vectors 112, one for each modality (for example, a text vector 114 and a URL vector 116)").

18. A computing device as recited in claim 13, wherein the instructions for iteratively clustering further comprise instructions for determining similarity between individual ones of the multi-type data objects, the similarity being a function of one or more of inter-object and intra-object content similarity and similarities between respective ones of the relationships (See e.g. [0003], "The invention relates to... an efficient scheme for assigning data objects in a collection to clusters based on similarities in their contents and characteristics").

19. A computing device as recited in claim 13, wherein the instructions for iteratively clustering further comprise instructions for merging related ones of the multi-type data objects to reduce feature space dimensionality of the related ones (See e.g. [0033], "various document features in different modalities are appropriately weighted and combined to form clusters representative of overall similarity").

20. A computing device as recited in claim 13, wherein the instructions for iteratively clustering further comprise instructions for iteratively clustering until all object types represented by the multi-type data objects converge (See e.g. [0078], "the collection 120 comprises all known documents that will ever by [sic] processed by a system according to the invention" where the "process" is illustrated in Fig. 3 and where "converge" is defined in Applicant's specification paragraph [0074] as, "each type of the different kinds of nodes and links are examined to obtain structural information that can be used for clustering").

22. A computer-readable medium comprising computer-executable instructions executable by a processor for:

identifying one or more of intra-layer and inter-layer relationships among respective ones of two or more multi-type data objects, wherein the respective ones comprise at least one object of a first type and at least one object of a second type different from the first type (See e.g. [0022], "Disparate types of information such as text, image features and usage are referred to as "modalities." Multi-modal clustering hence is the grouping of objects that have data from several modalities associated with them."); and

iteratively clustering the multi-type data objects in view of respective ones of the relationships to generate reinforced clusters (See e.g. [0043], "iterative clustering and selection of cluster subsets can help a user identify images of interest").

23. A computer-readable medium as recited in claim 22, wherein the inter-layer relationships comprise one or more of content related information, user interest in an associated topic, and user interest in an associated Web page (See e.g. [0032], "The method takes advantage of multiple ways in which a user can specify items of interest. For example, in images, features from the text and image modalities can be used to describe the images... clustering may be performed on a different feature (e.g., surrounding text, image URL, image color histogram, genre of the surrounding text)").

24. A computer-readable medium as recited in claim 22, wherein the intra-layer relationships comprise at least one of query refinement(s), recommended Web page(s), and relationship(s) between respective users (See e.g. [0028], "It is also useful to be able to track individuals' information access habits by way of the characteristics of the documents those users

access, thereby enabling a recommendation system in which users are assigned to similar clusters").

25. A computer-readable medium as recited in claim 22, wherein each of the multi-type data objects are related to at least one of a search query data object type, a selected Web page type, and a user information type (See e.g. [0037], "Multi-modal features may take on many forms, such as user information, text genre, or analysis of images").

26. A computer-readable medium as recited in claim 22, wherein respective ones of the relationships are weighted to indicate importance to associated objects of the multi-type data objects (See e.g. [0033], "various document features in different modalities are appropriately weighted and combined to form clusters representative of overall similarity").

28. A computer-readable medium as recited in claim 22, wherein iteratively clustering further comprises propagating clustering results of a first iteration to all related data objects of the multi-type data objects, at least two of the related data objects being of heterogeneous data type, the propagating being used to enhance clustering of respective ones of the multi-type data objects in a second iteration of reinforced clustering operations (See e.g. [0152], "Scatter/Gather iteratively refines a search by "scattering" a collection into a small number of clusters, and then a user "gathers" clusters of interest for scattering again. The Scatter/Gather method is extended by the invention to extend to a multi-modal, multi-feature method, using both text and image features to navigate a collection of documents with text and images").

29. A computer-readable medium as recited in claim 22, wherein iteratively clustering further comprises determining similarity between individual ones of the multi-type data objects, the similarity being a function of at least one of object content similarity and similarities between

respective ones of the relationships (See e.g. [0003], "The invention relates to... an efficient scheme for assigning data objects in a collection to clusters based on similarities in their contents and characteristics").

30. A computer-readable medium as recited in claim 22, wherein iteratively clustering further comprises merging related ones of the multi-type data objects to reduce feature space dimensionality of the related ones (See e.g. [0033], "various document features in different modalities are appropriately weighted and combined to form clusters representative of overall similarity").

31. A computer-readable medium as recited in claim 22, wherein the instructions further comprise instructions for mutually reinforcing importance of individual ones of the multi-type data objects within an object type and between different object types (See e.g. [0097], "The use of token frequency weight and inverse context frequency weight for the embedding employed by the invention is consistent with the following intuitive description. Each additional occurrence of an element (or word, for example) in a context (e.g., a document) reflects an increased level of importance for that element as a descriptive feature").

34. A computing device comprising:

identifying means to identify relationships among respective ones of two or more multi-type data objects, wherein the respective ones comprise at least one object of a first type and at least one object of a second type different from the first type (See e.g. [0022], "Disparate types of information such as text, image features and usage are referred to as "modalities." Multi-modal clustering hence is the grouping of objects that have data from several modalities associated with them."); and

iterative clustering means to iteratively cluster the multi-type data objects in view of respective ones of the relationships to generate reinforced clusters (See e.g. [0043], "iterative clustering and selection of cluster subsets can help a user identify images of interest").

35. A computing device as recited in claim 34, wherein the computing device further comprises weighting means to weight respective ones of the relationships to indicate importance to associated objects of the multi-type data objects (See e.g. [0033], "various document features in different modalities are appropriately weighted and combined to form clusters representative of overall similarity").

37. A computing device as recited in claim 34, wherein the iterative clustering means further comprise aggregating means to propagate indicated data object relationships to related ones of the multi-type data objects based on content of the reinforced clusters (See e.g. [0031], "Each modality within each document is described herein by an n-dimensional vector, thereby facilitating quantitative analysis of the relationships among the documents in the collection" where, see [0076], "As illustrated in FIG. 1, each document (for example, an HTML document 110) chosen from a collection 120 maps to a set of feature vectors 112, one for each modality (for example, a text vector 114 and a URL vector 116)").

38. A computing device as recited in claim 34, wherein the iterative clustering means further comprise determining means to determine similarity between individual ones of the multi-type data objects, the similarity being a function of at least one of object content similarity and similarities between respective ones of the relationships (See e.g. [0003], "The invention relates to... an efficient scheme for assigning data objects in a collection to clusters based on similarities in their contents and characteristics").

39. A computing device as recited in claim 34, wherein the iterative clustering means further comprise merging means to combine related ones of the multi-type data objects to reduce feature space dimensionality of the related ones (See e.g. [0033], "various document features in different modalities are appropriately weighted and combined to form clusters representative of overall similarity").

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 6, 12, 16, 21, 27, 33, 36, and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schuetze et al. as applied to claims 1-5, 7-10, 13-15, 17-20, 22-26, 28-31, 34, 35, 37-39 above, in view of Bowman et al., U.S. Pat. 6,169,986.

As per claims 6, 16, and 27, Schuetze et al. disclose the subject matter of the claim upon which the instant claims depend, but do not appear to disclose making a "search term suggestion". However, Bowman et al. do make such a disclosure, see e.g. Detailed Description par. 2, "The system uses the query term correlation data in combination with the query term(s) entered by the user to recommend additional query terms for refining the query". Schuetze et al. and Bowman et al. are analogous art because they both discuss search queries. At the time of the invention, it would have been obvious to one of ordinary skill in the art having the teachings of Schuetze et al. and Bowman et al. before him or her to use clustering to make search term suggestions. The motivation for combining these features is found in Bowman et al. Brief

Summary par. 7, "search engines, such as Excite™ and AltaVista™, suggest related query terms to the user as a part of the "search refinement" process. This allows the user to further refine the query and narrow the query result by selecting one or more related query terms that more accurately reflect the user's intended request" and Schuetze et al. [0029], "This disclosure sets forth a framework for multi-modal browsing and clustering, and describes a system advantageously employing that framework to enhance browsing, searching, retrieving and recommending content in a collection of documents."

As per claims 12, 21, 33, and 40, Schuetze et al. disclose the subject matter of the claim upon which the instant claims depend, but do not appear to fully disclose the limitations of the instant claims. However, Bowman et al. do make such a disclosure (See claim 12 below as exemplary). Schuetze et al. and Bowman et al. are analogous art because they both discuss search queries. At the time of the invention, it would have been obvious to one of ordinary skill in the art having the teachings of Schuetze et al. and Bowman et al. before him or her to combine these features. The motivation for making the combination is found in Bowman et al. Brief Summary par. 7, "search engines, such as Excite™ and AltaVista™, suggest related query terms to the user as a part of the "search refinement" process. This allows the user to further refine the query and narrow the query result by selecting one or more related query terms that more accurately reflect the user's intended request" and Schuetze et al. [0029], "This disclosure sets forth a framework for multi-modal browsing and clustering, and describes a system advantageously employing that framework to enhance browsing, searching, retrieving and recommending content in a collection of documents."

Claim 12 is reproduced here as exemplary of claims 12, 21, 33, and 40.

12. A method as recited in claim 1, and further comprising:

responsive to receiving a term from a user, comparing the term with feature space of objects in the reinforced clusters (See e.g. Schuetze et al. [0087], "adding a document that contains a unique word will impact the text vectors for all documents in the collection, as that word will require adding an extra term to each document's text vector");

responsive to comparing, identifying one or more search term suggestions (See e.g. Bowman et al. Abstract, "A search engine is disclosed which suggests related terms to the user to allow the user to refine a search"); and

communicating the search term suggestions to the user (See e.g. Bowman et al. Abstract, "A search engine is disclosed which suggests related terms to the user to allow the user to refine a search").

As per claim 36, Schuetze et al. disclose the subject matter of the claim upon which the instant claim depends, but do not appear to disclose how to "locate a search term suggestion from the reinforced clusters responsive to receipt of a bid term". However, Bowman et al. do make such a disclosure, see e.g. Detailed Description par. 2, "The system uses the query term correlation data in combination with the query term(s) entered by the user to recommend additional query terms for refining the query". Schuetze et al. and Bowman et al. are analogous art because they both discuss search queries. At the time of the invention, it would have been obvious to one of ordinary skill in the art having the teachings of Schuetze et al. and Bowman et al. before him or her to combine these features. The motivation for making the combination is found in Bowman et al. Brief Summary par. 7, "search engines, such as Excite™ and AltaVista™, suggest related query terms to the user as a part of the "search refinement" process.

This allows the user to further refine the query and narrow the query result by selecting one or more related query terms that more accurately reflect the user's intended request" and Schuetze et al. [0029], "This disclosure sets forth a framework for multi-modal browsing and clustering, and describes a system advantageously employing that framework to enhance browsing, searching, retrieving and recommending content in a collection of documents."

Claims 11 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schuetze et al. as applied to claims 1-5, 7-10, 13-15, 17-20, 22-26, 28-31, 34, 35, 37-39 above, in view of Pooser et al., U.S. Pat. 5,812,134.

As per claims 11 and 32, Schuetze et al. disclose the subject matter of the claims upon which the instant claims depend, but do not appear to disclose "mutually reinforcing importance of individual ones of the multi-type data objects within an object type and between different object types". However, Pooser et al. do make such a disclosure, see e.g. Fig. 4 and Detailed Description par. 4, "the "element" includes a pointer to a data object in the hypermedia database. The data object may be, but is not limited to, one of the following types: a text file; a graphics file representing still image; a video file representing motion video; a sound file; a help text page; a patient record; an encyclopedia entry; etc", par. 5, "A "node" is a collection, or a set, of elements. The elements constituting a single node can be of different types", and par. 6, "A "thread" is a collection of ordered nodes. The component nodes of the thread share a commonality of subject or idea". Schuetze et al. and Pooser et al. are analogous art because they both discuss clustering data. At the time of the invention, it would have been obvious to one of ordinary skill in the art having the teachings of Schuetze et al. and Pooser et al. before him or her to combine these features. The motivation for making the combination is found in Pooser et al.

Brief Summary par. 12, "There is therefor a need to provide an improved system and method for interactive, three-dimensional graphic presentation of information organization within an information base, which system and method allow the user to efficiently navigate through the information base by following a graphically-implied path of search progression, as well as allowing the user to customize chosen information units of the information base".

Claim 11 is reproduced here as exemplary of claims 11 and 32.

11. A method as recited in claim 10, wherein mutually reinforcing importance of individual ones of the multi-type data objects within an object type and between different object types is based on the following:

$$a(X) = \beta L_X^T h(X) + (1-\beta) L_{XY} i(Y)$$

$$h(X) = \beta L_X a(X) + (1-\beta) L_{XY} i(Y)$$

$$i(X) = a(X) + h(X)$$

$$a(Y) = \gamma L_Y^T h(Y) + (1-\gamma) L_{YX} i(X)$$

$$h(Y) = \gamma L_Y a(Y) + (1-\gamma) L_{YX} i(X)$$

$$i(Y) = a(Y) + h(Y)$$

wherein $X = \{x_1, x_2, \ldots x_m\}$ and $Y = \{y_1, y_2, \ldots y_n\}$ represent respective object sets of heterogeneous object type, R_X, R_Y, R_{XY} and R_{YX} represent relationships between respective objects of the multi-type data objects, L_X and L_Y represent adjacent matrixes of link / relationship structures within set X and Y respectively, L_{XY} and L_{YX} represent adjacent matrixes of links / relationships from objects in X to objects in Y, $a(X)$ and $h(X)$ are an *authority* score and *hub* score of nodes within X ,./respectively, $a(Y)$ and $h(Y)$ stand for the *authority* and *hub* score of nodes in Y; $i(X)$ and $i(Y)$

stand for the *importance* of the node in X and Y, respectively. β and γ are the weight parameters to adjust the influence of links derived from different relationships.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Aaron J. Sanders whose telephone number is 571-270-1016. The examiner can normally be reached on M-Th 7:30a-5:00p.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Christian Chace can be reached on 571-272-4190. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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AJS

CHRISTIAN CHACE
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2100